studies and occupations, the seeing eye was of infinite—even fundamental—service.

After a brief *résumé* of the history of botany in England and an appreciation of the services rendered to the science by men like Grew, John Ray, Robert Brown and others, Sir William expressed the hope and belief that England would again attain and retain the premier place in botanical study and research, and that the botanists of Liverpool would so use their splendid opportunities as to maintain the reputation of their country. He went on to speak of the great industries which had their origin in botanical discoveries, of the value of the science to medicine, and pointed out a fact too often overlooked that plants were intimately connected with every phase and stage of human life until, in the final act of the drama, they facilitated our decay.

After a vote of thanks to Sir William Thiselton-Dyer for his address, proposed by Sir John Brunner, M.P., and seconded by Prof. Harvey Gibson, and the presentation of memorial keys to Mr. Hartley and Sir William Thiselton-Dyer, the guests adjourned to the Hartley Laboratories, which were thrown open for inspection.

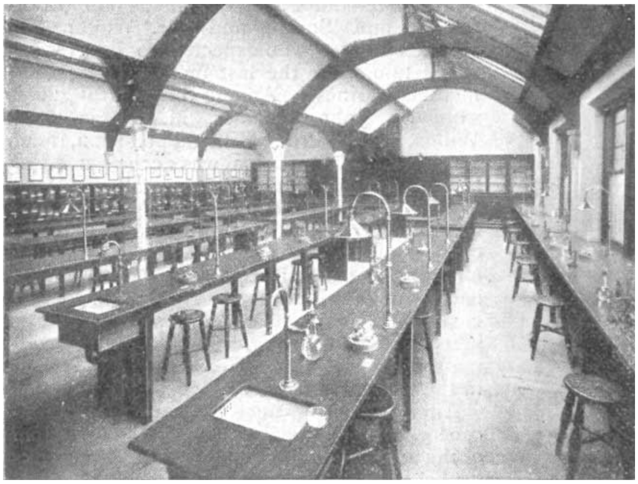

FIG. 2.—Elementary Laboratory. Hartley Laboratories, Liverpool.

THE HUGH MILLER CENTENARY.

THE proposal to celebrate the centenary of the birth of Hugh Miller during the present year has met with general approval, and the erection of an institute bearing his name in Cromarty has been admitted to be the best means of appropriately celebrating his memory.

It is intended that the Hugh Miller Institute shall take the form of a museum, where any relics pertaining to Miller can be kept; and a free library and reading room.

The centenary committee have had the promise of support from Hugh Miller's admirers in America and the colonies, as well as at home, and Mr. Carnegie, the generous supporter of such institutions as the proposed institute, has made the handsome offer to give 100*l.* for every 100*l.* raised by the committee.

It is desirable that the memorial should be as widely representative as possible, and the committee therefore appeal to all who appreciate the work accomplished by Hugh Miller in science and literature for contributions, in order that the scheme may be sufficiently advanced by the aniversary of his birth in October.

Contributions should be sent to the Treasurer, Commercial Bank, Cromarty.

The movement has the support of the following:—

Lord Balfour of Burleigh, Secretary for Scotland: Sir Archibald Geikie, F.R.S., LL.D.; Prof. Masson, LL.D.; Sir John Leng, M.P.; Sir Walter Foster, M.P.; C. J. Guthrie, K.C., Sheriff of Ross and Cromarty; W. C. Smith, LL.B.; Prof. Duns, Edinburgh; A. Taylor Innes, Esq., Edinburgh; Prof. Clarke, State College, New York; W. Robertson Nicol, LL.D.; A. Bignold, Esq., M.P.; Principal Rainy, D.D.; Alexander Whyte, D.D.; Colonel Ross, C.B., of Cromarty; Mr. James Barron, *Inverness Courier*; W. J. Watson, B.A., Secretary Inverness Field Club.

J. BAIN, Hon. Sec.,
Hugh Miller Centenary Committee.

Cromarty, May, 1902.

LAZARUS FUCHS.

THE name of Lazarus Fuchs will always be associated with the theory of linear differential equations, to which he gave an extraordinary impulse by his famous memoir published in the sixty-sixth volume of Crelle's *Journal*. In this paper the methods of modern function-theory are brought to bear upon the long-familiar process of solving a differential equation by series. The coefficients of the equation being supposed to be uniform analytical functions with isolated singularities, it is shown how to obtain, in the neighbourhood of an ordinary point, a complete set of independent integrals; the analytical form of these solutions is determined, and shown to depend upon a certain fundamental or indicial equation. It is proved, also, that the singularities of the integrals may be deduced from the coefficients without integration, and the notion of regular integrals is developed. The distinction is made between the integrals which involve logarithms and those which do not, and attention is drawn to those equations the integrals of which have no essential singularity. Thus in a single memoir of moderate length all the essential features of an extensive theory are presented in a clear and comprehensive outline.

In the rapid development which followed the publication of this memoir, the author naturally took a prominent part. Among his important contributions may be mentioned his researches on linear equations with algebraic integrals, on constructing linear equations the integrals of which have assigned singularities, and on equations the integrals of which are connected by algebraic relations. An instructive illustration of the general theory is given by his memoir on the equation satisfied by the elliptic integrals K, K′.

When the independent variable describes a closed curve, a set of integrals undergo a linear substitution, and all the substitutions arising from different paths form a group associated with the equation. M. Poincaré assigned the name of Fuchsian functions to functions invariant for a group of linear transformations of the variable in recognition of Fuchs's results concerning equations of the second order.

Fuchs's mathematical papers are very pleasant to read and free from that tendency to heaviness which is apt to belong to memoirs on differential equations. He had the faculty of bringing out clearly the really important points without over-elaborate detail, and he did not disdain to show the power of his methods by applying them to specific and definite problems. In these respects he may be compared with Halphen. While admitting that his way was prepared by the work of Cauchy, Briot and Bouquet, and Riemann, we may fairly claim for him that he has been the effective pioneer in a vast and fascinating region.

It is interesting to remember that Henry Smith, in a presidential address to the London Mathematical Society

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in 1876, directed attention to the importance of Fuchs's then recent publications. How true was his forecast, that "they must form the basis of all future inquiries on this part of the subject," the history of the years that followed has fully shown.

Fuchs was born at Moschin (Posen), May 5, 1833; he became extraordinary professor at Berlin in 1866, ordinary professor at Greifswald in 1869, at Göttingen in 1874, at Heidelberg in 1875, and finally at Berlin in 1884.

G. B. M.

CARLO RIVA.

ITALIAN geology has sustained a heavy loss in the death of the young and accomplished Docent in petrography and Assistant in the mineralogical laboratory of the University of Pavia, Dr. Carlo Riva, who was killed by an avalanche on the 3rd inst. while ascending Monte Grigna. Besides contributing descriptions of various Italian minerals, he specially interested himself in the study of the volcanic rocks of Italy, and in conjunction with his friend G. de Lorenzo he had been for some time engaged in a detailed investigation of the volcanic cones and rocks of the "Campi Phlegræi." The first fruits of this conjoint labour appeared a year or two ago in a monograph on the remarkable but seldom visited cone of the island of Vivara, which was noticed in NATURE last year. Never before had such a combination of geological and petrographical skill been devoted to any of the old volcanoes of that classic district, so that geologists who had seen the memoir looked forward with much interest to the application of the same talents to the other cones. It is understood that the account of Astroni was far advanced towards completion. But all this bright promise of a career that would have advanced the cause of science and shed lustre on the scientific work of Italy has been abruptly quenched. Those who knew Carlo Riva personally will keenly feel the untimely extinction of a nature so gentle and kindly, so enthusiastic and unwearying in pursuit of science, so full of power and yet so modest and retiring. He has died a martyr to the energy with which he followed his favourite studies, and carries with him to the grave the respect and affection of a wide circle of friends.

A. G.

NOTES.

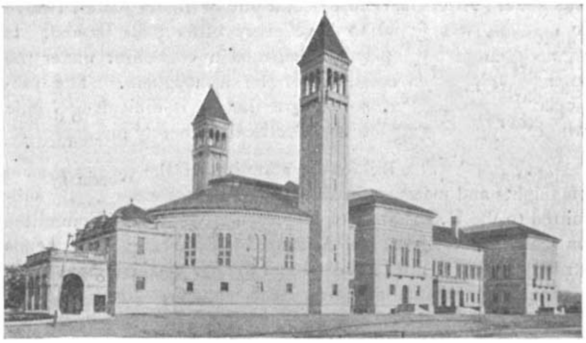
THE Prince and Princess of Wales were present at the Royal Institution on Friday last when Sir Benjamin Baker delivered a lecture on "The Nile Dams and Reservoir." Before the lecture several striking experiments were shown to their Royal Highnesses by Lord Rayleigh, Sir William Crookes, Prof. Dewar and Prof. Macfadyen.

THE Rome correspondent of the *Daily Mail* announces that the Accademia dei Lincei has decided to give Mr. Marconi a prize of 400*l*. as a reward for his work with wireless telegraphy. From the same source we learn that Mr. Pierpont Morgan has presented a set of cut precious stones, valued at 2000*l*., to the museum of the Jardin des Plantes, at Paris.

SEVERAL correspondents have sent to the daily papers accounts of the fall of a yellow powder on June 1 and 2 during a thunderstorm. At Great Yeldham, in Essex, and at Langport, Somerset, this yellow sediment was found after the storm had subsided, and was thought to be sulphur. Mr. C. Turner has, however, pointed out in the *Times* that the substance supposed to be sulphur is in reality the pollen from pine trees. This is often produced in large quantities and has many times been mistaken in country places for "showers of sulphur."

MR. F. FINN sends us from Calcutta an account of colour variation in a family of pigeons which have sprung from a pair of homing pigeons imported from England last year. "Of the original pair," he says, "the cock is a blue chequer and hen a silver chequer. None, however, of their descendants have been silver, but all blue chequers, with the exception of one, a blue almost exactly resembling the wild *Columba livia*, but with no white on the back. As against this one case of reversion, there have been two of progressive variation; for two birds, grandchildren of the original pair, though of different broods, show white in the tail, though their parents and grandparents had none." A naturalist to whom the observations have been shown remarks:—"The production of white feathers in the tail I should hardly regard as a case of progressive variation. It is more probably a reversion to some previous ancestor. Homing pigeons are not bred for colour, and it is almost certain that some of the ancestors of the pair sent would have had white feathers in the tail."

AT the forthcoming meeting of the American Association at Pittsburg, several of the sections and affiliated societies will meet in the Carnegie Institute, where the offices and reception room of the Association will also be situated. The accompanying view of the Institute is reproduced from the preliminary programme of the meeting. The local committee is a large one and contains many leading men and women connected with Pittsburg; Mr. George Westinghouse, jun., is the president. It is noteworthy as evidence of sympathy with scientific efforts that the following resolutions were adopted unanimously on March 24 by the Federation of Churches at Pittsburg, Allegheny and vicinity:—"Inasmuch as all truth is one and is divine and inasmuch as all organisations for its conservation and propagation are kindred, the Federation of Churches of Pittsburg, Allegheny and vicinity records its pleasure in the fact that the American Association for the Advancement of Science is to hold its anniverary in Pittsburg this year. In behalf of the churches we desire a large and representative meeting here of the seers and prophets of science. In behalf of those interested in the advancement of education and knowledge we extend to them a hearty welcome."



Carnegie Institute, Pittsburg.

THE seventh annual congress of the South-Eastern Union of Scientific Societies, held at Canterbury on June 5–7, was as successful as any of the preceding ones. Thirty-seven societies are now affiliated to the Union, a slight increase on last year; the accounts showed a small balance, and the attendance was good. An invitation to meet at Dover next year was accepted, and Sir Henry Howorth, F.R.S., was elected president for that meeting. Papers were read on "The Marine Aquarium," by Mr. Sibert Saunders, and on "Mycorhiza," by Miss A. Lorrain Smith; Prof. Poulton gave a lecture on "Recent Researches on

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